Unlicensed use of the 6 GHz Band

PRESENTATION TO FCC STAFF

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Matt Swenson
VP Emerging Products/Technology
NFL

Josh Helmrich
Director, Media Strategy and Business Development
NFL

Bill Burns
EVP & Chief Product Officer
Zebra Technologies

Carl Mower
Sr. Director of Engineering
Zebra Technologies

Gerard Waldron
Partner
Covington & Burling

Veronica O'Connell
Principal
TwinLogic Strategies

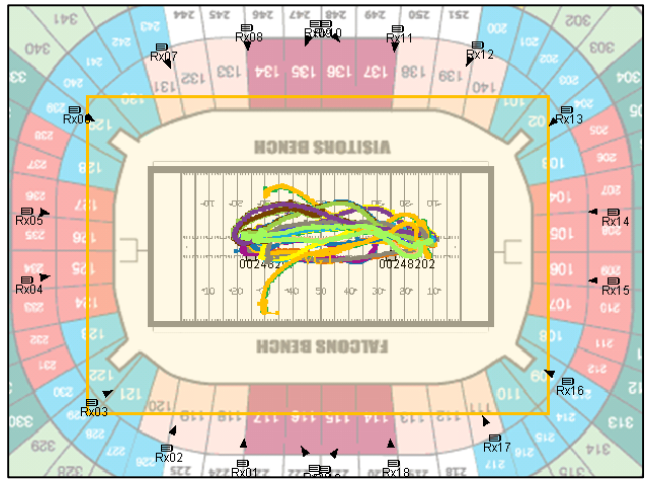
Zebra provides locating solutions not possible using Wi-Fi

What is Zebra's Dart technology?

- Real-Time Locating System (RTLS)
- Based on Ultrawideband (UWB) Impulse radio
- Unlicensed in ~ 6300-6800 MHz band (Part 15.250)
- Provides fast (1000s/sec), accurate (< 1ft) location of micropower tags

How it works:

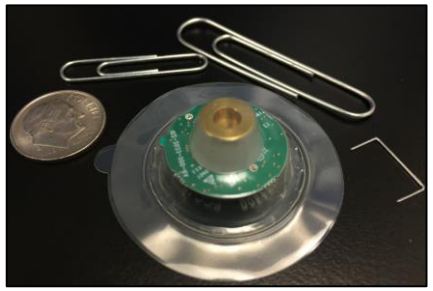
- Short bursts of data with high timing accuracy
- Time-of-arrival at multiple receivers, then calculate position
- High peak-to-average ratio mitigates interference to victims



In widespread, production use:

- Industrial: Tool tracking, worker safety
- Sports: Real time Player and Ball tracking in NFL
- Use cases that could NOT be accomplished via Wi-Fi

Zebra's UWB solution is deployed at all NFL venues

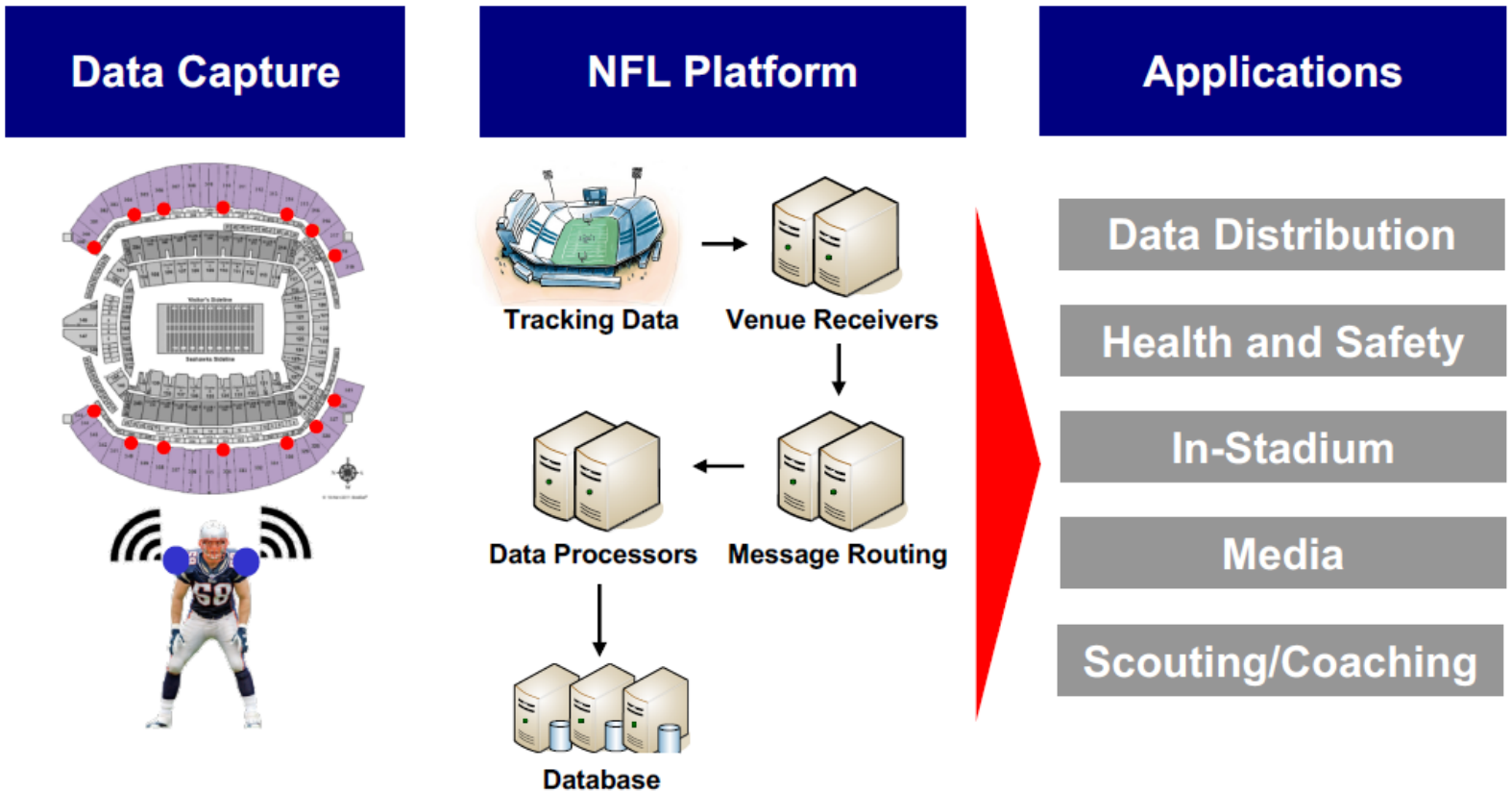


Zebra UWB solution is the sole player tracking solution for NFL

- Every game-day venue (31 USA venues plus UK and Mexico)
- Every game all-season long
- In every game, every player, every official, every ball
- Every 1/10th of a second
- Completed 5 seasons with NFL

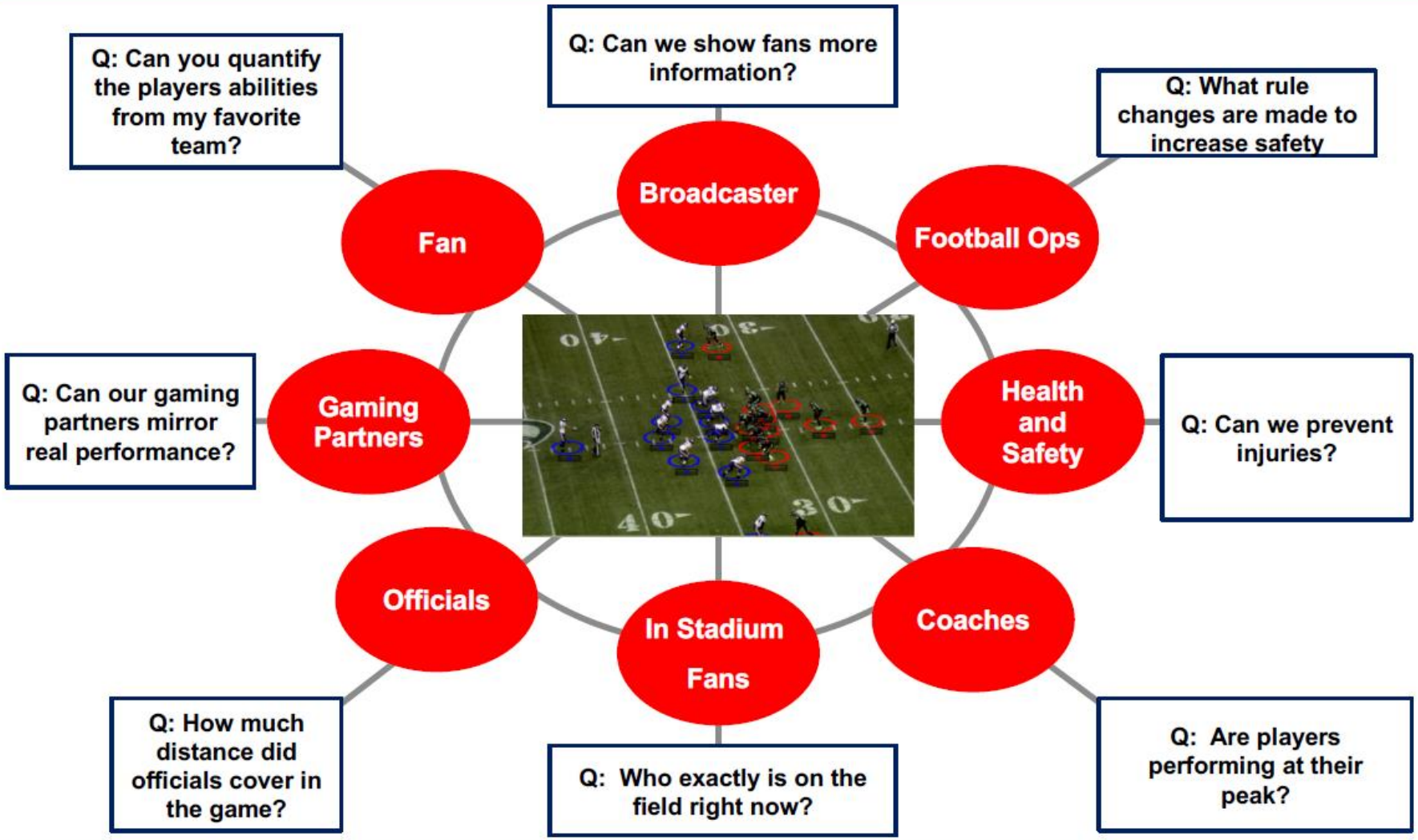
Zebra solution is also used by 1/3rd of teams to track practices

Tracking System Overview



Tracking system uses 400Mhz of UWB 6.35Ghz to 6.75Ghz
Typically all RF coordinated 200Mhz away from tracking system

Next Gen Stats Use Cases



NFL's proprietary Next Gen Stats have broad uses across entire NFL ecosystem… fans, players, game, etc.

Proposed rules would severely impact Zebra's UWB solution

A single Mobile Access Point on site could render a UWB solution inoperative

- Virtually impossible to administratively control the public's use of Wi-Fi hotspots:
  - A single patron at a NFL event enabling a hotspot
  - A vendor at an industrial facility enabling a hotspot

Even fixed 6 GHz infrastructure beyond the perimeter would introduce unpredictability

- FS community is strongly concerned about pervasive Wi-Fi landing in their licensed beams
- Prior unpredictability demanded that Wi-Fi at 5 GHz automatically adapt to the environment via DFS

Proposed power levels would adversely impact UWB at significant distances

- Power levels permitted for 2.4 & 5 GHz (especially ISM bands) are inappropriate at 6 GHz
- Proposed outdoor power levels would interfere at distances well beyond UWB operating ranges

Zebra's proposed compromises to achieve coexistence

Prohibit Mobile Access Points

- There is no way to mitigate against mobile APs; they are too unpredictable, especially in public spaces
- The NPRM already suggests prohibiting use on trains, planes, etc.

Allow industrial exclusion zones

- Allow industrial participation in AFC Database
- Dynamic beacon (similar to DFS)

Limit Wi-Fi power

- Limit Wi-Fi to ~30mW across most of 5925-7125 MHz
- If allowing higher power, only on the low end: 5925-6100 MHz